

# JAPAN

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JIS T 9241-4 (2008) (English): Hoists for the transfer of persons with disabilities -- Part 4: Rail guide hoists

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*The citizens of a nation must  
honor the laws of the land.*

Fukuzawa Yukichi

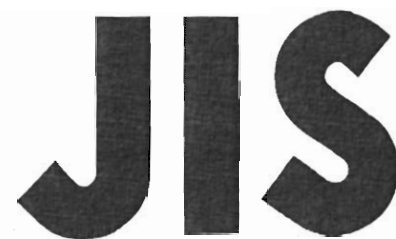
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JAPANESE  
INDUSTRIAL  
STANDARD

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JIS T 9241-4 : 2008

**Hoists for the transfer of persons with  
disabilities — Part 4: Rail guide hoists**

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## Contents

	Page
Introduction .....	1
1 Scope .....	1
2 Normative references.....	1
3 Terms and definitions .....	2
4 Classification and division.....	4
4.1 Classification .....	4
4.2 Division (symbol for division) according to maximum load .....	4
5 Design, appearance and construction .....	4
5.1 Design .....	4
5.2 Appearance .....	4
5.3 Construction .....	5
6 Performance.....	6
6.1 General requirements.....	6
6.2 Rate (velocity) of lifting and lowering.....	6
6.3 Operating forces.....	6
6.4 Durability .....	7
6.5 Static strength .....	7
6.6 Static stability test .....	7
6.7 Sound level .....	7
7 Test methods.....	7
7.1 General .....	7
7.2 Test methods for performance .....	8
8 Inspection .....	11
9 Marking and instruction for use.....	12
9.1 Marking .....	12
9.2 Instruction for use .....	12
Annex A (normative) Hydraulic and pneumatic components—Requirements .....	14
Annex B (informative) Periodic inspection.....	16
Annex C (informative) Applications of hoists.....	17
Annex JA (informative) Comparison table between JIS and corresponding International Standard.....	18

## Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

This JIS document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

**JIS T 9241** consists of the following 5 parts under the general title “*Hoists for the transfer of persons with disabilities*”:

*Part 1 : Classification and general requirement*

*Part 2 : Mobile hoist*

*Part 3 : Stationary hoists*

*Part 4 : Rail guide hoists*

*Part 5 : Sling Sheets*

# Hoists for the transfer of persons with disabilities—

## Part 4 : Rail guide hoists

### Introduction

This Japanese Industrial Standard has been prepared based on the first edition of ISO 10535 published in 1998 dividing into parts by classification of products and with some modifications of the technical contents to reflect domestic situation.

The portions given continuous sidelines or dotted underlines are the matters not stated in the original International Standard. A list of modifications with the explanation is given in Annex JA.

### 1 Scope

This Standard specifies rail guided hoists which are a type of hoist used for the persons unable to easily transfer or move on their own (hereafter referred to as “hoists”).

NOTE : The International Standard corresponding to this Standard is as follows.

ISO 10535:1998     *Hoists for the transfer of disabled persons—Requirements and test methods* (MOD)

In addition, symbols, which denote the degree of correspondence in the contents between the relevant International Standard and JIS, are IDT (identical), MOD (modified), and NEQ (not equivalent) according to ISO/IEC Guide 21.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 8360	<i>Wire reinforced rubber hose assemblies for hydraulic use</i>
JIS B 8361	<i>Hydraulic fluid power—General rules relating to systems</i>
JIS B 8364	<i>Textile reinforced rubber hose assemblies for hydraulic use</i>
JIS B 8370	<i>Pneumatic fluid power—General rules relating to systems</i>
JIS C 1509-1	<i>Electroacoustics—Sound level meters—Part 1: Specifications</i>
JIS C 9730-1	<i>Automatic electrical controls for household and similar use—Part 1: General requirements</i>
JIS T 9241-1	<i>Hoists for the transfer of persons with disabilities—Part 1: Classification and general requirement</i>
JIS Z 8703	<i>Standard atmospheric conditions for testing</i>



### 3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in JIS T 9241-1 and the following terms and definitions apply:

#### 3.1 rail guided hoist

a hoist that is transferred along the rail fixed above the head, for example, to the ceiling, wall or support

The rail guided hoist includes a ceiling hoist and a stationary free standing hoist (see figure 1).

#### 3.2 ceiling hoist

a type of rail guided hoist, which is an overhead mounted hoist fixed to the ceiling or wall(s), including rail parts.

#### 3.3 body-support unit

the part of the hoist that supports the person being lifted, moved or transferred (e.g. sling, seat, stretcher, etc) along with the associated attachment construction

#### 3.4 adverse condition

the condition in which failure is most likely to occur

#### 3.5 central suspension point (CSP)

a reference point on the hoist to be used for measurements (this point may be a connecting point)

#### 3.6 connecting point

the part to which the body-support unit attaches

#### 3.7 control devices

the part(s) of the hoist which operates the lifting and lowering mechanism of the CSP as well as other functions

#### 3.8 end limiting device

a device that stops any movement at a predetermined end position

#### 3.9 flexible device

a component of the lifting device which connects the spreader bar with the component that functions as a lifting device (e.g. chain, tape, rope)

#### 3.10 free-wheeling

the mechanism to transmit only a force in one way direction and to spin free in the reverse rotation, like a rear wheel of bicycles

#### 3.11 hoisting range

the vertical distance between the maximum and minimum heights of the CSP (see figure 2)

#### 3.12 hold to run control device

control device which initiates and maintains the operation of the hoist element only as long as the manual control is actuated

The manual control automatically returns to the “stop” or “off” position when released.

### **3.13 lifted person**

the person who is transferred by the hoist

### **3.14 lifting cycle**

the raising and lowering of the lifting machinery for the same distance in both directions

### **3.15 lifting device**

means of lifting and lowering the body-support unit

### **3.16 lifting machinery**

device that performs the lifting function

### **3.17 maximum load**

the greatest permissible load, including the lifted person, the body-support unit, etc, that can be applied to the hoist

### **3.18 multi-purpose hoist**

a hoist that can be assembled, possibly with the use of different parts, to provide a variety of operations

### **3.19 attendant**

the person who operates the hoist to transfer or move the lifted person

### **3.20 slings**

the body-support unit manufactured from such soft cloth that fits the body and to be attached to the lifting device of the hoist

### **3.21 rigid body-support unit**

a preformed seat or recumbent device, manufactured from rigid materials (if necessary padded), or flexible materials encased by a frame, with associated connecting means for attaching to the lifting device of the hoist

### **3.22 single fault condition**

condition in which a single means for protection against a safety hazard in equipment is defective or a single external abnormal condition <sup>1)</sup> is present

Note <sup>1)</sup> For example, electric power failure is supposed.

### **3.23 sitting part**

part of the body-support unit that is available for sitting on

### **3.24 spreader bar**

a rigid construction with more than one connection point, onto which the body-support unit is attached

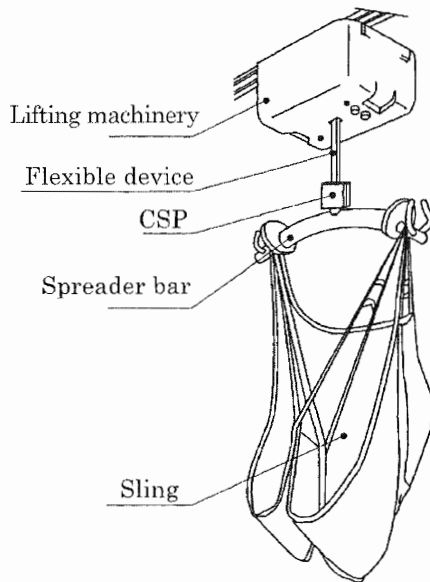


Figure 1 Example of rail guided hoist

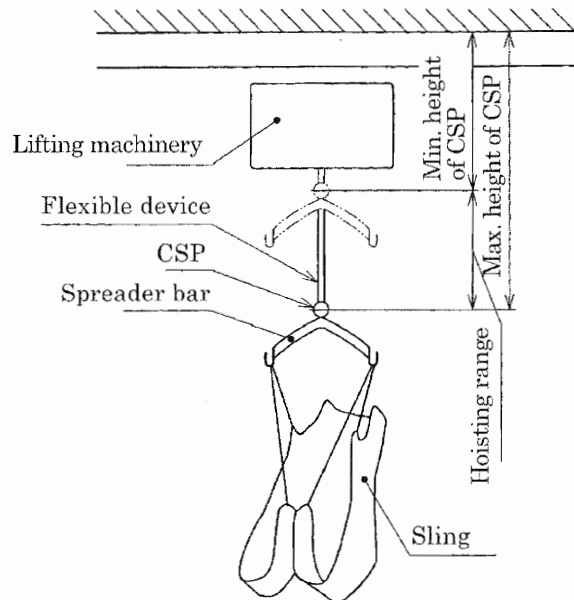


Figure 2 Example of hoisting range

## 4 Classification and division

### 4.1 Classification

The classification of rail guided hoists shall be as given in 4.1.1 of JIS T 9241-1.

### 4.2 Division (symbol for division) according to maximum load

The division (symbol for division) according to the maximum load shall be as given in 4.2 of JIS T 9241-1.

## 5 Design, appearance and construction

### 5.1 Design

#### 5.1.1 Risk analysis

The risk analysis shall be as given in 5.2.1 of JIS T 9241-1.

#### 5.1.2 Ergonomics factors

The ergonomics factors shall be as given in 5.2.2 of JIS T 9241-1.

### 5.2 Appearance

The appearance shall be as follows.

- For hoists, all accessible edges, corners and surfaces shall be smooth and have no burrs or sharp edges.
- If coated, the surface shall be smooth and free from noticeable holes or bubbles.

### 5.3 Construction

The construction of rail guided hoists shall be as given in 5.3 of JIS T 9241-1, and as follows.

- a) All load-bearing fasteners shall be either self-locking or fitted with a locking device to prevent inadvertent detachment.
- b) Single use components (e.g. self-tapping screws) shall not be used to secure any component that can be deemed to be load-bearing. In addition, they shall not be used for the assembly of any component(s) that is intended to be removed for the purpose of dismantling for transport or storage.
- c) All projections shall be avoided or fitted with adequate protection, such as covers and cushions to prevent damage or injury (e.g. shearing or crushing).
- d) The hoist shall include in its design some means (e.g. limiting switches, the principal of free-wheeling, etc.) that will ensure that, when lowering, should the body-support unit, spreader bar or lifting arm come into contact with the lifted person, the total load imposed on the lifted person shall not be greater than the total mass of any of those parts. When operated, these means shall not allow the hoist to face unsafe conditions such as falling off of the lifting arm.
- e) All control devices, for lowering or raising the lifted person, shall be easily accessible and operable by the person operating the hoist.
- f) Electrically operated hoists shall be provided with an emergency device which is wired to isolate the power supply and to stop any electrically produced mechanical movement which could cause a safety hazard.
- g) All control devices shall be of the 'hold to run' type.
- h) Hoists shall be provided with a safety device that ensures that the lifted person does not fall in the event of a single-fault condition of the lifting machinery.
- i) The connection point(s) shall be smooth thus avoiding excessive wear of any connectors.
- j) All hoists shall be provided with an emergency lowering device.

NOTE : The emergency lowering device is a safety device which ensures to lower the lifted person in an emergency.

- k) Hoists with hydraulic system or pneumatic system shall be as specified in Annex A.
- l) The hoist shall be designed for the purpose of transferring a lifted person according to the field of application, as stated by the manufacturer (see Annex C) and it shall be able to be operated by one person. If not, this shall be stated in the instructions for use.
- m) On all battery-powered hoists, a warning device(s) shall be provided that will indicate when the battery or batteries require charging. Once this device starts operating, the sufficient power shall be available to complete one (1) full lifting cycle with the maximum load.

- n) Any hoist shall be so designed that it shall not operate if the load of more than 1.5 times the maximum load is applied.
- o) The CSP shall be so designed that the spreader bar does not fall during the normal operation.
- p) When the up-and-down movement of CSP is restricted with the electric switch, a device of another system shall be provided so that a failure of the end limiting device will not cause a critical condition.
- q) When the width of the spreader bar is adjustable during use, a safety device shall be provided to prevent the spreader bar from falling.
- r) The ceiling hoist, which can be transferred from one system to another one per a course-switching device, shall be provided with a safety device so that the lifting machinery can be transferred from one rail to another rail only when all associated connection parts are safe. The safety device shall also incorporate the interlocking device so that the hoist can move in the horizontal direction only when the rail is at the right position.

## 6 Performance

### 6.1 General requirements

General requirements are as follows.

- a) Electrically operated hoists shall conform to clauses 8, 9 and 13 of JIS C 9730-1 regarding electrical safety.
- b) The electromagnetic compatibility of electrically operated hoists shall conform to clauses 23 and 26 of JIS C 9730-1.
- c) After tested in accordance with 7.2.1 a), any flexible lifting devices such as tape, rope or chain, associated lifting joints and hinge connections shall show no sign of damage that will affect the function of the hoist as stated by the manufacturer.
- d) The CSP shall have a stopping distance of not more than 50 mm when tested according to 7.2.1 b).
- e) The rate of travel of the hoist which can move horizontally with the power shall be not more than 0.25 m/s when tested according to 7.2.1 c).

### 6.2 Rate (velocity) of lifting and lowering

The rate of lifting and lowering shall be as follows.

- a) The rate of lowering shall not exceed 0.15 m/s when loaded with the maximum load after tested according to 7.2.2 a).
- b) The rate of raising or lowering shall not exceed 0.25 m/s when unloaded after tested according to 7.2.2 b).

### 6.3 Operating forces

The operating forces required for those parts of the hoist that are designed to be operated by fingers, hands or feet shall not exceed the following values after tested according to 7.2.3.

- a) Operation by using a finger 5 N
- b) Operation by using a hand 105 N
- c) Operation by using a foot 300 N
- d) Operation by a turning 1.9 Nm

#### 6.4 Durability

- a) After tested according to 7.2.4.1, the hoist shall show no signs of permanent deformation or wear that may affect its function.
- b) After tested according to 7.2.4.2, the hoist and the dead-end of rails shall show no signs of deformation or damage that may pose a problem for use.

#### 6.5 Static strength

The static strength shall be as follows.

- a) After tested according to 7.2.5 a), the stationary free standing hoist shall show no signs of deformation or damage that may affect its function.
- b) After tested according to 7.2.5 b), the horizontal rail used for installation of the rail guided hoist shall have the flexible volume of not more than 1 mm per 200 mm of the rail.
- c) After tested according to 7.2.5 c), the rail guided hoist shall retain the function indicated by the manufacturer and show no signs of deformation or damage that may affect its function.

#### 6.6 Static stability test

After tested according to 7.2.6, the stationary free standing hoist shall maintain stability at the inclination not less than 10°.

#### 6.7 Sound level

When measured in accordance with the method of 7.2.7, the hoist shall have the maximum sound level not exceeding 65 dB.

### 7 Test methods

#### 7.1 General

##### 7.1.1 Test conditions

The hoist shall be tested as it is delivered to the customer. However, if the hoist is of a multi-functional design and can be assembled in different formats, it shall be assembled according to the instructions supplied by the manufacturer. If the hoist is intended to be used in different combinations, then all combinations shall be tested in the most adverse condition. The tests shall be carried out under normal indoors conditions <sup>2)</sup>. All tests shall be carried out in the order stated.

The test report referred to in 7.1.4 shall be placed in the manufacturer's technical file.

Note <sup>2)</sup> The temperature of (20 ± 15) °C and relative humidity of (65 ± 20) % are specified in JIS Z 8703.

### 7.1.2 Test equipment

The test equipment shall be as follows:

- a) When a cylindrical load is required, it shall be made of steel, with rounded edges (not less than  $R\ 25\text{ mm}$ ) and diameter of 350 mm. For the testing of sling, the load can be used to represent the proposed body to be lifted.
- b) The simulated testing equipment shall be capable of simulating use in practice (e.g. test fingers).
- c) The strength testing equipment shall be capable of applying loads with negligible dynamic factor.

### 7.1.3 Tolerances of test equipment

For the test equipment, the following tolerances on measurements apply.

- a) Force/Loads  $\pm 5\%$
- b) Velocity  $\pm 5\%$
- c) Angle  $\pm 0.25^\circ$
- d) Length  $\pm 0.5\text{ mm}$  for  $\leq 150\text{ mm}$   
 $\pm 5.0\text{ mm}$  for  $> 150\text{ mm}$
- e) Time  $\pm 0.1\text{ s}$

### 7.1.4 Test report

The test report shall include at least the following information:

- a) A description of the product, including type and designation;
- b) Name and address of the manufacturer;
- c) A photograph of the hoist equipment as presented during test;
- d) Name and address of the testing laboratory;
- e) The stability values to the nearest  $0.5^\circ$  rounded downwards;
- f) Result of tests including record of maintenance, if any;
- g) Any deviations from the standardized test procedure;
- h) Date of test.

## 7.2 Test methods for performance

### 7.2.1 General requirements

The performance shall be confirmed according to the following procedure.

- a) For the flexible devices including tapes, wires or chains, and their joints used for lifting, statically apply 6 times the maximum load for 20 min. For the hinge parts, statically apply 4 times the maximum load for 20 min. Then, check the results by visual inspection.

- b) The test for the CSP shall be carried out according to the following procedure.
  - 1) Load the hoist with the maximum load.
  - 2) Set the CSP to the top position.
  - 3) Lower the CSP at the full speed.
  - 4) When the CSP is lowered to the middle of lifting range, remove the energy source from the hoist to cease (e.g. by releasing the relevant control button, closing the relevant hydraulic valve(s) or ceasing to wind manually).
  - 5) Measure the vertical distance from the point where the energy source has been ceased to the point where the lowering has stopped actually.
- c) With the hoist unloaded, measure the hoist rate at the centre of the range of rail. In addition, check that such an accelerated velocity that the lifted person may fall out of the sling never occurs under accelerating or decelerating.

#### **7.2.2 Rate (velocity) test of lifting and lowering**

The test of rate of lifting and lowering shall be as follows.

- a) Lowering the hoist with loaded with the maximum load, measure the lowering rate at the middle of lifting range.
- b) Lifting and lowering the hoist with unloaded, measure each lifting and lowering rate at the middle of lifting range.

#### **7.2.3 Operating forces test**

With the hoist loaded with the maximum load, measure the operating forces of all control devices of the hoist. These measurements shall be taken according to the methods specified by the manufacturer.

#### **7.2.4 Durability test**

##### **7.2.4.1 Durability test for the hoists**

The durability test shall be as follows.

- a) Place the hoist on a horizontal surface with the base locked in the adverse condition (the weakest strength condition). The hoist shall be secured against moving on the surface.
- b) For manually operated hydraulic hoists, the stroke of the pump lever shall be as long as possible and constant.
- c) The working/pause ratio (duty cycle) during the test shall be 15/85.
- d) If necessary, it is permissible to use an alternative power supply instead of the battery.
- e) Raise and lower the hoist by 250 mm or 25 % of the vertical movement, whichever is the greater, in the middle of the lifting range. Ensure that the pause in the lifting cycle and the loading and unloading is carried out when the hoist is at the lowest position of the lifting cycle.



- f) Repeat the lifting cycle of hoist for 10 000 times in total, according to the following procedure.
  - 1) 1 000 lifting cycles with the maximum load according to e) at the lower-end of the lifting range of the hoist. For electrical hoists, activate the lower-end limiting device in every cycle.
  - 2) 1 000 lifting cycles with 80 % or over of the maximum load according to e) at the top of the lifting range of the hoist. For electrical hoists, activate the top-end limiting device in every cycle.
  - 3) 3 000 lifting cycles with 80 % or over of the maximum load according to e) in the middle of the lifting range of the hoist.
  - 4) 5 000 lifting cycles with 60 % or over of the maximum load according to e) in the middle of the lifting range of the hoist.
- g) During the lifting cycle, vertical swing of the load may be adjusted in such a way that the swing induces only a negligible dynamic element.

#### 7.2.4.2 Durability of the hoist and the dead-end of rails

Make the hoist unloaded transfer to the dead-end of rail 100 times at 1.5 m/s for the manual ceiling hoist and the maximum rate for the driving ceiling hoist.

#### 7.2.5 Static strength test

The static strength test shall be as follows.

- a) **Static strength test for the stationary free standing hoist** The hoist and lifting machinery shall be loaded statically according to the following procedure.
  - 1) Place and fix the hoist on an inclined surface of 10° in the adverse direction.
  - 2) Load the hoist with 1.25 times the maximum load for 5 min under the adverse conditions.
  - 3) Place the hoist at the horizontal surface and load it with 1.5 times the maximum load for 20 min under the adverse conditions.
- b) **Rail flexible volume test for rail guided hoist** Make the hoist transfer to the position under the adverse conditions for flexure of the rails mounted as indicated by the manufacturer, load statically the spreader bar of the hoist with the maximum load and record the flexible volume at the place.
- c) **Static strength test for rail guided hoist** Mount the hoist to the rail as indicated by the manufacturer. In addition, load the spreader bar of the hoist with 1.5 times the maximum load for 20 min at the position under the adverse conditions for the strength of rails.

#### 7.2.6 Static stability test

The static stability test for the stationary free standing hoist shall be conducted according to the following procedures at the most unstable position in the positional relation between the CSP and supporting structure.

- a) **Unloaded** Position the unloaded hoist on the test surface (see figure 3). Incline the test plane gradually until the hoist loses its equilibrium (balance). Record the angle of inclination. Repeat the test in four directions ( $0^\circ$ ,  $90^\circ$ ,  $180^\circ$  and  $270^\circ$  based on the first measuring direction).
- b) **Loaded** Apply the hoist's CSP with the maximum load in the adverse condition in such a way that the load is allowed to move freely. Repeat the same procedure as for the unloaded hoist, and record the angle of inclination at which the hoist falls down in four directions.

Set the CSP at the position under the adverse condition.

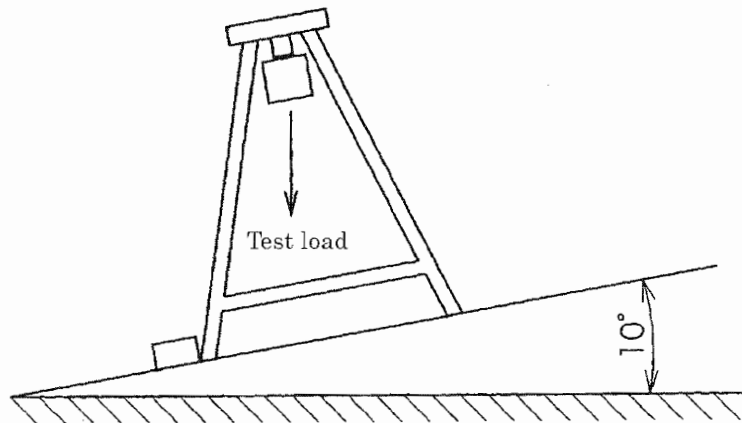


Figure 3 Stability test for the stationary free standing hoist

#### 7.2.7 Test for sound level

Apply the maximum load to the hoist at the position that is horizontally 1 m away from the lifting machinery and 1 m high, and measure the sound level during 1 lifting cycle using a sound level meter specified in JIS C 1509-1.

### 8 Inspection

Inspection of the hoist is divided into type inspection<sup>3)</sup> and delivery inspection<sup>4)</sup>. The respective inspection items are as follows.

The method of sampling inspection for the both inspections shall be upon the agreement between the purchaser and the manufacturer.

Notes <sup>3)</sup> Type inspection is intended to judge whether the products conform to all characteristics specified in the design.

<sup>4)</sup> Delivery inspection is intended to judge whether the products conform to the required characteristics in the case of delivery of the products that have been designed and manufactured in the same way as the products having already passed the type inspection.

#### a) Items for type inspection

- 1) Appearance

- 2) Construction
- 3) Performance
- b) Items for delivery inspection
  - 1) Appearance

## 9 Marking and instruction for use

### 9.1 Marking

All operation control devices shall be marked for their intended function. Every hoist or any main part of a multi-purpose hoist shall be permanently marked with the following information as a minimum:

- a) Name and address of the manufacturer
- b) Number of this Standard, classification and symbol for division  
Example 1 JIS T 9241-4 : Rail guided hoist—WM
- c) Model definition (model and symbol/number specified by manufacturers)
- d) Lot or batch and/or serial number
- e) Year and month of manufacture or their abbreviation
- f) Electrical details (voltage and power consumption or consumption current)
- g) Details of any other energy source (e.g. hydraulic/pneumatic system)
- h) Maximum load

Example 2 Maximum load : 75 kg (including lifted person, body-support unit and others)

Example 3 Maximum load : 75 kg (including fixed body-support unit (5 kg), lifted person and others)

- i) For removable spreader bar, maximum load which the spreader bar can sling

### 9.2 Instruction for use

The instruction for use shall contain the following information.

- a) Name, address, telephone number and facsimile number of the manufacturer, supplier or agent if different
- b) How to operate, install and assemble
- c) Intended use of the hoist (see Annex C);
- d) Periodical inspection cycle, cleaning method and maintenance information (see Annex B)
- e) Details for trouble shooting/assistance
- f) Information on the sling suitable for the spreader bar, if any
- g) Technical specifications

- 1) Dimensions (including the following)
  - Hoisting range at the hoist height shown in figure 2
- 2) Maximum load
- 3) Safety precautions

Example 1. The maximum load includes the mass of body-support unit and devices attached along with the lifted person, etc. and shall not be exceeded in use.

- 4) Total weight of the unloaded hoist or the weights of any main parts that can be dismantled where appropriate (e.g. for transportation)
  - Total mass of hoist excluding body-support unit (if the rigid body-support unit is integrated into the hoist, the mass of it will be included.)
  - Number of parts and name of each parts, if dismantled
  - Mass of the heaviest parts
- h) Electrical information (voltage and power consumption or consumption current)
- i) Acceptable accuracy of measuring device (e.g. weighing scale) and operating instructions for the products with “Warning” or “Attention” marks
- j) List of spare parts
- k) Description of warning or attention for encouraging to surely refer to the instruction for use of the sling to be used
- l) List of daily inspection items
- m) With or without waterproof property for electric components such as an operation device

## Annex A (normative)

### Hydraulic and pneumatic components—Requirements

#### Introduction

This Annex specifies requirements for hydraulic and pneumatic components, if they are used in hoists.

#### A.1 Hydraulic components

**A.1.1** Hydraulic actuators (including hoses, pipes, connectors and other components on the pressure side) shall be taken account so as to withstand all loads occurring through pressure. In addition, they shall be compatible with the hydraulic fluid (a fluid used in the hydraulic equipment or hydraulic system) and be designed to take account of direct stresses induced by torsion, vibration and physical damage.

**A.1.2** The hydraulics components shall meet the following requirements.

- a) For outer cylinders, the dimensions shall be calculated in accordance with JIS B 8361. If the calculations are made using only the static pressure (fluid pressure actuating on parallel surface to fluid line), it shall be assumed that the calculated pressure will be 1.8 times the actual static pressure.
- b) For rigid pipes and fittings, the dimension shall be calculated in accordance with JIS B 8361. If the calculations are made using only the static pressure, it shall be assumed that the calculated pressure will be 2 times the actual static pressure.
- c) Flexible hoses shall be manufactured in accordance with the requirements of JIS B 8360 or JIS B 8364.

**A.1.3** A non-return valve (a valve which is allowed to flow in only one direction and prevents the opposite flow) shall be fitted to allow the hoist to hold the permissible load at any point when the supply pressure drops below the minimum operating pressure (the minimum pressure ensuring actuation of devices).

**A.1.4** The non-return valve shall be capable of closing by the jack-side hydraulic pressure and at least one guide spring or gravity.

**A.1.5** A pressure relief valve (a pressure control valve by relieving some part of or all fluids to maintain pressure in circuit) shall be fitted, which is adjusted to limit the pressure to 1.5 times the operating pressure (a pressure when equipment or system is actually operated). The relieved hydraulic fluid shall be returned to the reservoir.

**A.1.6** The hydraulic system shall be capable of exhausting air (air bleeding).

**A.1.7** For powered hydraulic systems, means shall be provided to easily check the level of the hydraulic fluid in the reservoir.

#### A.2 Pneumatic components

**A.2.1** In addition to the requirements stated in **A.1**, the following shall apply.

**A.2.2** Pneumatic actuators (including hoses, pipes, connectors and other components on the pressure side) shall be taken account so as to withstand all loads occurring through pressure in accordance with **JIS B 8370**.

**A.2.3** Safety valves shall be allowed to adjust up to 1.5 times the static pressure caused by the application of maximum load. The safety valve shall be protected against adjustment by unauthorized personnel.

## Annex B (informative)

### Periodic inspection

#### Introduction

This Annex (informative) is to describe the matters related to the periodic inspection of the hoist to be carried out by users and not to constitute the provisions of this Standard.

**B.1** Periodic inspection of the hoist should be undertaken at the time intervals stated by the manufacturer, but at least once a year. The periodic inspection is visually carried out. Particularly, for the hoist's load bearing construction, the hoist with brakes and lifting machinery including control unit, safety device and body-support unit, function tests and maintenance measures such as adjustment of brakes and tightening of fasteners should be carried out. Every inspection should include a working load test of one lifting cycle with the maximum load.

**B.2** Periodic inspection should be performed by a person who is suitably and properly qualified and well acquainted with the design, use and care of the hoist. The scope of the periodic inspection should be included in the manual supplied with the hoist.

**B.3** Any significant observations for safety of the hoist should be noted, preferably in a logbook, which should be retained by the person(s) responsible for the servicing/maintenance of the hoist. The date when corrective actions are taken, in response to the noted observations, should also be noted in the logbook.

**B.4** A record of the inspection date of hoist and the inspection result should be noted in the logbook together with the signature of the inspector. The detachable rigid body-support units inspected visually should be plainly marked for identification and noted in the logbook. The record should include the situation of use such as home or type of institution.

**B.5** If periodic inspection reveals any defect, wear or other damage that jeopardizes the safety of the hoist, the owner should immediately be notified. In the event of immediate danger to safety, the hoist should immediately be taken out of service. It may then not be used until the deficiency has been eliminated.

**B.6** When serious defects and damages to the safety have occurred in the hoists between two periodic inspections and any corrective actions have already taken, these defects and damages should be entered in the logbook.

**B.7** Defects and damages should be reported back to the manufacturer for action. This feedback should be reported in the logbook.

## Annex C (informative)

### Applications of hoists

#### Introduction

This Annex (informative) is to describe applications of hoists and not to constitute the provisions of this Standard.

This Annex shows some examples of typical applications of hoists. It represents the state of the art at the time of drafting.

When the hoists are used as follows, the given guidance will be based on the principals of avoiding undue stress of the attendant and the lifted person.

#### Examples of typical applications

- Use in conjunction with a wheelchair
- Use in conjunction with a bathtub
- Use in conjunction with a bed
- Use in conjunction with a shower seat
- Use in conjunction with a toilet
- Lifting from the floor
- Use in conjunction with other technical aids



Annex JA (informative)

Comparison table between JIS and corresponding International Standard

JIS T 9241-4 : 2008 <i>Hoists for the transfer of persons with disabilities—Part 4: Rail guide hoists</i>					ISO 10535 : 1998 <i>Hoists for the transfer of disabled persons—Requirements and test methods</i>		
(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Details of technical deviation	
1 Scope	Specifies the design, appearance, construction and performance, etc. of rail guided hoists.	ISO 10535	1	Specifies general requirements of hoists and body-support units supporting the transfer of disabled persons.	Deletion	Divides one International Standard into parts 2 to 5 in JIS.	Divides into parts 2 to 5 in consideration of convenience of users of standards. No substantial deviations.
2 Normative references							
3 Terms and definitions	Adds the matters relating to rail guided hoists.		3	Definitions of terms	Addition	Describes the terms referred in JIS.	No substantial deviations.
4 Classification and division 4.1 Classification	Divides by classification of hoists and body-support unit (quotes JIS T 9241-1).		—		Addition	Specifies in detail according to intended purpose.	

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Details of technical deviation	
4.2 Division (symbol for division) according to maximum load	Divides by the maximum permissible load of hoists (quotes JIS T 9241-1).		—	The maximum load of 120 kg or more	Addition	Conforms to physical size of Japanese people.	Proposal will be submitted to ISO in the future.
5 Design, appearance and construction 5.1 Design 5.1.1 Risk analysis	Indirectly quotes the following standard by quoting JIS T 9241-1. <i>JIS Z 8051 Safety aspects—Guidelines for their inclusion in standards</i>		4.1.1	<b>EN 1441</b> <i>Medical devices—Risk analysis</i> Specifies procedures to investigate safety of medical devices according to clarification of hazard and evaluation of risk.	Alteration	Adopts well-known method in Japan from among risk analysis methods specified in EN 1441.	Specifies in consideration of convenience of users of the Standard. Review will be made when EN 1441 is designated as International Standard.
5.1.2 Ergonomics factors	Indirectly specifies required items by quoting JIS T 9241-1.		4.1.2	Specifies <b>EN 614-1</b> <i>Safety of machinery. Ergonomic design principles—Part 1: Terminology and general principles.</i>	Alteration	No substantial deviations.	Specifies in consideration of convenience of users of the Standard. For quotation of ISO/IEC Guide 51, proposal will be submitted to JIS.
5.2 Appearance	Specifies relating to painting.				Addition	Specifies relating to painting as appearance.	No essential deviations.

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Details of technical deviation	
5.3 Construction o) and q)	Specifies relating to spreader bar.		7	It is specified in clause 7 of ISO 10535.	Alteration	Alteration of component	No substantial deviations.
6.1 General requirements a) and b)	Quotes JIS C 9730-1 for electrical safety and electromagnetic compatibility.		8.2.1	Quotes EN 1021-1 and EN 1021-2.	Alteration	Quotation of EN makes it hard to use this ISO standard in every country. So, quotes IEC (JIS) that is equivalent to EN.	Proposal will be submitted for quotation of IEC 60730-1.
7.2.7 Test for sound level	Specifies the use of the sound level meter specified in JIS C 1509-1 and the position of measurement.		4.1.3	ISO 3741:1988 <i>Acoustics—Determination of sound power levels of noise sources—Precision methods for broad band sources in reverberation rooms</i>	Alteration	Adopts practical methods.	Specifies in consideration of convenience of users of the Standard. No essential deviation.
			4.2.2.6	ISO 3744:1988 <i>Acoustics—Determination of sound power levels of noise source—Methods for free field conditions over a reflecting plane</i>			

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Details of technical deviation	
8 Inspection			—		Addition	Specifies in detail.	
9 Marking and instruction for use 9.1 Marking			4.11.1	<b>EN 980</b> <i>Graphical symbols for the use in the labelling of medical devices</i>	Alteration	Quotation of <b>EN</b> in <b>EN 980</b> as well as quotation of <b>EN 980</b> makes it hard to use this <b>ISO</b> standard in every country.	Clearly specifies marking items. Any countermeasures are not required.
9.1 b) c) d)	Division symbol by the maximum load				Addition	Describes according to division by body weight.	No substantial deviations.
9.1 h)	Maximum load				Addition	Stipulates weight range of user.	Proposal will be submitted to <b>ISO</b> .
9.2 k)	Recommends the reference of instruction for use of sling.				Addition		Clearly specifies designation matters. Any countermeasures are not required.
			5 6	Mobile hoists Stationary hoists	Deletion	Prepares specific <b>JIS</b> individually.	Divides into parts 2 to 5 in consideration of convenience of users of the Standard. Any countermeasures are not required.
—			8	Rigid body support unit	Deletion	Preparation will be made individually in the future.	

(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause		(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	Classification by clause	Details of technical deviation	
Annex A (normative)	Hydraulic and pneumatic components—requirements		Annex C			—	
A.1.2	<b>JIS B 8361</b>		C.1.2	<b>DIN 2413</b> <i>Steel pipe Part 1 : Design of steel pressure pipes</i>	Alteration	In order to ensure the following matters, <b>JIS B 8361</b> specifies as guidelines for manufactures and purchasers. a) Safety b) System operation without failure and trouble c) Easy and economical maintenance d) Long-life system <b>DIN 2413</b> is a standard relating to design.	<b>ISO 10535</b> quotes <b>DIN 2413</b> and <b>DIN 2413</b> quotes <b>DIN</b> . These quotations make it hard to use this <b>ISO</b> standard in every country. Therefore, in the future, proposal will be submitted to <b>ISO</b> for quotation of <b>ISO 4413</b> that is identical with <b>JIS B 8361</b> .
A.2.2	<b>JIS B 8370</b>		C.3.2	No quoting Standards.	Alteration	Quotes <b>JIS B 8370</b> .	No substantial deviations.
			Annex ZZ	International Standard and European Standard for information	Deletion	Describes in this Annex.	Any countermeasures are not required because of description in this Annex.

Overall degree of correspondence between **JIS** and International Standard (ISO 10535 : 1998) : MOD

NOTE 1 Symbols in sub-columns of classification by clause in the above table indicate as follows:

- Deletion : Deletes specification item(s) or content(s) of International Standard.
- Addition : Adds the specification item(s) or content(s) which are not included in International Standard.
- Alteration : Alters the specification content(s) which are included in International Standard.

NOTE 2 Symbol in column of overall degree of correspondence between **JIS** and International Standard in the above table indicates as follows:

- MOD : Modifies International Standard.

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